

10. (Second Amendment) A method of producing a heat conductive sheet including a substrate and a heat conductive resin layer applied to one surface of said substrate, comprising the steps of supporting said substrate by a support by releasably bonding the substrate to the support; applying a film-forming resin composition containing a binder resin and a heat conductive filler to a non-supporting surface of said substrate to form a self-supporting adhesive heat conductive resin layer; and separating the resulting heat conductive sheet from said support; wherein said substrate has a thickness from 1 to 12 μm .

A version with changes marked in the claims relative to the previous version of the claims is attached.

Remarks

Claims 1 and 10 have been amended. Claims 1-17 are pending.

Examination and reconsideration of the application as amended is requested.

Applicants respectfully request entry of this Amendment After Final Rejection. The amendments to the claims raise no new issues that would require further consideration, no additional claims are presented, and no issues of new matter are raised as basis is provided in the specification for each new limitation. The Amendment places the application in better form for appeal. The Amendment was not earlier presented because it was believed that previously presented arguments and amendments were sufficient to overcome the grounds of rejection. Support for amendments can be found in the specification as filed, for example on page 21 lines 7-11, in Example 4 on page 20 (line 3), and page 17 lines 18-20.

§ 102 Rejections

Claims 1-7 are rejected under 35 U.S.C. 102(b) as purportedly being anticipated by Parker-Hannifin Corporation (PHC).

In addition to referencing the earlier Office Action, the Examiner stated that PHC teaches using substrates of about 0.0127-0.127 mm (12.7-127 μm) (p. 15, lines 8-15). The Examiner concluded that since ranges reciting "about" are conventionally interpreted to encompass $\pm 10\%$, it is the Examiner's position that the reference encompasses substrates having a thickness of 12 μm .

The Examiner's argument hinges on the meaning of "about" in PHC. The argument assumes that this means $\pm 10\%$, with no basis. Applicants respectfully request that the Examiner cite a reference defining the meaning in PHC or withdraw the rejection. If the Examiner is relying on personal knowledge to support this conclusion, Applicants request that the Examiner provide an affidavit or declaration setting forth specific factual statements and supportive explanations as required by 37 CFR 1.104(d)(2).

Further, Applicants submit that the 1-12 μm thickness range required in the present invention is outside the teaching of PHC. The section cited states that the "reinforcement member" has a thickness of 127 to 12.7 μm with 50 μm being preferred for metal foils. It is counterintuitive to expect that a material below the cited range and dramatically below the preferred level has been described by PHC.

The enclosed amendment further distinguishes the present invention from PHC by requiring that the resin layer be a self-supporting adhesive and that this be applied to one surface of the substrate. The substrate is very thin and flexible. In contrast, the Parker substrate is a reinforcing layer within a double-sided adhesive tape.

In addition, as to claim 3, the Examiner stated that "[s]ince metal foil substrates are chosen instead of plastic film, the reference anticipates any limitation of the plastic film." Office Action of 13-Feb-02, page 3, referenced at page 2 ¶ 5 of the Office Action of 22-Aug-02. Claim 3 incorporates all the limitations of claims 1 and 2, and further specifies that the substrate is a polyolefin film. It is believed that this is an improper rejection. Nothing on the record shows where PHC describes, teaches, or suggests the invention of claim 3.

The rejection of claims 1-7 under 35 U.S.C. 102(b) as purportedly being anticipated by PHC is unwarranted in part and overcome in part and should be withdrawn.

Claims 1-7 and 11 are rejected under 35 U.S.C. 102(b) as purportedly being anticipated by Bujard.

The Examiner stated that Bujard discloses a laminate comprising a substrate having a thickness of 10-100 μm and an adhesive layer applied to at least one surface which contains a heat-conductive filler (abstract), thus providing a heat conductive sheet. The Examiner stated that since the reference teaches at least one coated side of a substrate, one skilled in the art would envision

both single- and double-sided adhesive substrates. The Examiner stated that Bujard substrates include films, foils, or cloths of metal or synthetic resin (col. 2, lines 3-7) and that since metal foil substrates are chosen instead of plastic film, and since claim 3 does not limit a plastic film to be chosen, the reference anticipates any limitation of the plastic film. The Examiner stated that suitable adhesives, which may be provided with a release film, include polyurethanes, polyacrylates, and silicones (col. 2, lines 20-29) and that Bujard cites boron nitride, silicon carbide, and other inorganic fillers as heat conductive fillers.

The enclosed amendment requires that the resin layer be self-supporting, while being provided in combination with the thin, flexible substrate. Bujard does not describe, teach, or suggest this combination.

As noted above, claim 3 incorporates all the limitations of claims 1 and 2, and further specifies that the substrate is a polyolefin film. The Examiner's argument does not show where the reference describes, teaches, or suggests this combination. Thus, this rejection is improper and should be withdrawn.

The rejection of claims 1-7 and 11 under 35 U.S.C. 102(b) as purportedly being anticipated by Bujard has been overcome and should be withdrawn.

§ 103 Rejections

Claim 9 is rejected under 35 U.S.C. 103(a) as purportedly being unpatentable over Parker-Hannifin Corporation (PHC). Claim 8 is rejected under 35 U.S.C. 103(a) as purportedly being unpatentable over PHC in view of Eddy et al. Claims 10, 13, and 15-17 are rejected under 35 U.S.C. 103(a) as purportedly being unpatentable over PHC in view of Matsushita Denki.

The Examiner repeated each rejection as entered in the prior Office Action, and additionally noted that PHC teaches that the coatings may be cured (p. 15, lines 18-22) and may be faced with a release liner (p. 8, lines 15-18).

In this case, the Examiner's argument effectively creates a conclusive presumption of obviousness. The law rejects such a presumption and requires that the "decision-maker must start over," even when *prima facie* obviousness is established. Ex parte Ohsaka, 2 USPQ2d 1461, 1462 (BPAI 1987). Here, the Examiner has not shown the claims to be *prima facie* obvious. The Examiner has not set forth (A) the relevant teachings of the prior art relied upon,

(B) the differences in the claim over the applied reference, (C) the proposed modification of the applied reference necessary to arrive at the claimed subject matter, and (D) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification. See MPEP § 706.02 (j).

In addition, these references do not describe, teach, or suggest providing the resin layer on one surface rather than both surfaces, and these reference do not describe, teach, or suggest a self-supporting adhesive layer as required by the amended claims.

Furthermore, the Examiner added the description of a fuser for photocopy processes in Eddy with the double-sided tape of PHC. As noted in the Amendment filed June 13, 2002, Eddy describes a fuser comprising a fluoropolymer binder with crosslinked silicone particles and two particle sizes of alumina. The Examiner concluded that it would have been obvious to select the two alumina materials from the fluoropolymer fuser area of Eddy and incorporate them into the thermally-conductive interface area with the PHC double-sided adhesive tape. However, Eddy lacks any discussion of an electronic thermal interface product or process. Eddy requires a non-stick fluoropolymer containing cured silicone particles along with the particulate alumina.

In this light, it is submitted that Eddy is non-analogous art. A prior art reference, in order to be relied upon as basis for rejecting the claims, must either be in the field of applicant's endeavor or, if not, be reasonably pertinent to a particular problem with which the invention was concerned. In re Oetiker, 24 USPQ 2d 1443 (Fed. Cir. 1992). The combination of elements from non-analogous sources, in a manner that reconstructs Applicants' invention only with benefit of hindsight, is insufficient to present a *prima facie* case of obviousness. Id.

As noted above, Eddy is outside the field of the inventors' endeavor. In addition, Applicants were seeking to develop an adhesive heat conductive sheet with a thin, flexible substrate. The Examiner's argument contradicts the Eddy aim of providing an entirely non-stick fuser member that allows the toner to become tacky (Eddy col. 1 lines 32-42) and yet the fuser must have a release surface (see, e.g., Eddy col. 2 lines 27-30) and cannot be adhesive. Thus, Eddy is not pertinent to the particular problems with which the Applicants were concerned when they made their invention. As a result, Eddy is non-analogous prior art, and it is improper to consider it as part of an obviousness determination.

As to claims 10, 13, and 15-17, the enclosed amendment further contrasts the invention from the cited references. Claim 10 requires that the support releasably bond to the substrate. The thin, flexible substrate of the present invention is thus supported while coating the self-supporting adhesive heat conductive resin layer.

In addition, the Examiner stated that Applicants had not shown how the Masushita Denki process lacks a reasonable expectation of success due to the abrasive nature of the required heat conductive filler. First, the Examiner's argument misplaces the burden. The Examiner's argument must provide the reasonable expectation of success to reach the claimed invention from the reference, as well as the suggestion in the art to make the combination. Second, absent Examiner's evidence to the contrary, abrasive particles would be expected to abrade a spray nozzle and a spray-coating process is believed to be unsuitable for the abrasive particles of the heat conductive filler in the invention. Thus, the skilled person would not combine the spray coating process of Masushita Denki with PHC.

The rejection of claim 9 under 35 U.S.C. 103(a) as purportedly being unpatentable over PHC, the rejection of claim 8 under 35 U.S.C. 103(a) as purportedly being unpatentable over PHC in view of Eddy, and the rejection of claims 10, 13, and 15-17 under 35 U.S.C. 103(a) as purportedly being unpatentable over PHC in view of Matsushita Denki are unwarranted in part and have been overcome in part and should be withdrawn.

Claim 9 is rejected under 35 U.S.C. 103(a) as purportedly being unpatentable over Bujard.

The Examiner stated that Bujard applies as above, lacking exemplification of including both silicon carbide and boron nitride particles in the adhesive compositions of the invention, but noted that Bujard describes mixtures of the components (col. 2, lines 51-58). The Examiner concluded that it would have been *prima facie* obvious to include both silicon carbide and boron nitride particles in the silicon adhesive of the invention in the expectancy of forming a tape having equally improved thermal conductivity.

Claim 9 depends from claim 1 and adds further limitations thereto. Claim 1, as amended in patentable as described above, thus claim 9 also is patentable. In addition, the only suggestion to combine the particular species of silicon carbide with boron nitride comes from Applicants' specification.

The rejection of claim 9 under 35 U.S.C. 103(a) as purportedly being unpatentable over Bujard has been overcome and should be withdrawn.

Claims 10-14 and 16-17 are rejected under 35 U.S.C. 103(a) as purportedly being unpatentable over Bujard in view of DuPont.

The Examiner stated that Bujard teaches that adhesives may be applied in molten form (col. 2, lines 23-26), and that Bujard applies as above, teaching methods for applying coatings by known coating methods including brushing and doctor coating (col. 2, lines 59-62). The Examiner stated that Bujard fails to specifically teach the steps of supporting the substrate and removing the substrate from the support after coating. The Examiner stated that DuPont teaches an improved method of coating by supplying a substrate support for the substrate and metering and supplying a coating solution by meyer bar onto the substrate (p. 2, line 33-p.3, line 11), where the meyer bar acts similarly to a doctor bar to "squeegee off" excess liquid coating (p. 4, lines 16-30). The Examiner stated that the product would be removed from the support to be used and concluded that since the coating apparatus provides a substantially uniform coating, it would have been *prima facie* obvious to use the meyer rod method of DuPont's teaching in Bujard's invention to provide coatings have improved uniformity and further concluded that the use of molten adhesive and meyer bar coating suggests the use of heat and an amount of pressure to coat the substrate.

Claim 10, as amended, requires, *inter alia*, bonding the substrate to the support. The Examiner's combination of reference does not describe, teach, or suggest the invention of the amended claims.

The rejection of claims 10-14 and 16-17 under 35 U.S.C. 103(a) as purportedly being unpatentable over Bujard in view of DuPont has been overcome and should be withdrawn.

In view of the above, it is submitted that the application is in condition for allowance. Reconsideration of the application is requested. Entry of the amendment and allowance of the pending claims, as amended, at an early date is solicited.

If the Examiner feels that any remaining questions or issues may be resolved through a discussion with Applicants attorney, the Examiner is invited to contact me at the telephone number below.

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Respectfully submitted,

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DMH/spg
55259US005 AMEND 2

Version With Markings to Show Changes Made

1. (Second Amendment) A heat conductive sheet including a substrate having a thickness from 1 to 12 μm and a self-supporting adhesive heat conductive resin layer applied to [at least] one surface of said substrate, characterized in that said heat conductive resin layer contains a binder resin, and a heat conductive filler dispersed in said binder resin.
3. (First Amendment) A heat conductive sheet according to claim 2, wherein said plastic film is a polyolefin film or a polyester film.
10. (Second Amendment) A method of producing a heat conductive sheet including a substrate and a heat conductive resin layer applied to [at least] one surface of said substrate, comprising the steps of supporting said substrate by a support by releasably bonding the substrate to the support; applying a film-forming resin composition containing a binder resin and a heat conductive filler to a non-supporting surface of said substrate to form a self-supporting adhesive heat conductive resin layer; and separating the resulting heat conductive sheet from said support; wherein said substrate has a thickness from 1 to 12 μm .